



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,614	08/28/2003	Guang Liu	IS01320AP	8296

22917 7590 05/04/2005

MOTOROLA, INC.
1303 EAST ALGONQUIN ROAD
IL01/3RD
SCHAUMBURG, IL 60196

EXAMINER

LOUIS JACQUES, JACQUES H

ART UNIT	PAPER NUMBER
----------	--------------

3661

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/650,614

Applicant(s)

LIU ET AL.

Examiner

Jacques H Louis-Jacques

Art Unit

3661

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,9,10,14 and 20 is/are rejected.
- 7) ☒ Claim(s) 3-8,11-13 and 15-19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 08282003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Raichle et al [US 2004/0124870].

Raichle discloses a method and apparatus for testing an electric motor (such as an electric power-assisted steering motor) for detecting faults in the motor. According to Raichle, there is provided determining a voltage vector of the electric power-assisted steering motor (abstract), measuring a current vector of the electric power-assisted steering motor (abstract), defining an acceptable angular relationship between the voltage vector and the current vector, comparing an angle between the measured current vector and the determined voltage vector, and indicating a fault if the angle does not meet the acceptable angular relationship. See abstract, figure 3, page 1 and 3.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 3661

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 9, 10, 14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mir et al [6,392,418] in view of Raichle [US20040124870].

Mir et al discloses a torque current comparison for current reasonableness diagnostic in a permanent magnet electric machine. According to Mir et al, there is provided determining a voltage (value) vector of an electric power-assisted steering motor, measuring a current vector of the electric power-assisted steering motor (abstract, columns 2 and 4). Mir et al discloses detecting a rotational direction and positional angle of the electric power-assisted steering motor and defining acceptable angular relationship between the motor position and the current vector. See abstract, figures 3, 6-7 and 16. Mir et al also discloses indicating a fault if the angle does not meet the acceptable angular relationship. In addition, Mir et al discloses a fault counter, wherein there is provided indicating a fault based on the fault repeats itself a predetermined number of times (abstract), figure 16. Mir et al discloses that the acceptable angular relationships used in fault detection are dynamically adjustable depending on steering conditions (column 2). While Mir et al discloses the voltage vector and the current vector (column 4) and the situations when they are in-phase (column 7), Mir et al does not particularly teach indicating a fault if the angle between the measured current vector and the determined voltage vector does not meet the acceptable angular relationship between the voltage vector and the current vector. Raichle, on the other hand, discloses a method and apparatus for testing an electric motor (such as an electric power-assisted steering motor) for detecting faults in

the motor. According to Raichle, there is provided determining a voltage vector of the electric power-assisted steering motor (abstract), measuring a current vector of the electric power-assisted steering motor (abstract), defining an acceptable angular relationship between the voltage vector and the current vector, comparing an angle between the measured current vector and the determined voltage vector, and indicating a fault if the angle does not meet the acceptable angular relationship. See abstract, figure 3, page 1 and 3. Thus, it would have been obvious to one skilled in the art at time of the invention to be motivated to modify the diagnostic method and system of Mir et al by incorporating the features from the method and system of testing of Raichle because such modification, as suggested by Raichle, would provide an effective way of determining the operability of the system.

Allowable Subject Matter

5. Claims 3-8, 11-13, 15-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art do not particularly teach a first acceptable angular relationship between the current and voltage vectors for a positive motor rotational direction where the angle of the voltage vector must lead the angle of the current vector, a second acceptable angular relationship between the current and voltage vectors for a negative motor rotational direction where the angle of the voltage vector must lag the angle of the current vector, a third acceptable angular relationship between the current and voltage vectors for a

substantially zero motor rotational direction where the angles of the voltage and current vectors are substantially in-phase, a fourth acceptable angular relationship between the current vector and motor position for a positive torque direction where the angle of the current vector must lead the motor position by a current alignment angle, and a fifth acceptable angular relationship between the current vector and motor position for a negative torque direction where the angle of the current vector must lag the motor position by the current alignment angle.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

3,866,117	Erdman	Feb. 1975
6,339,308	Shinnaka	Jan. 2002
6,381,528	Kawada et al	Apr 2002
6,427,105	Matsushita	Jul. 2002
6,501,243	Kaneko et al	Dec. 2002
6,644,433	Sato	Nov. 2003
6,694,237	Kifuku et al	Feb. 2004
6,831,477	Fukusumi et al	Dec. 2004
US20010005121	Sakamaki	Jun. 2001
US20030155172	Kawada et al	Aug. 2003
US20030222612	Matsushita	Dec. 2003

Art Unit: 3661

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacques H Louis-Jacques whose telephone number is 571-272-6962. The examiner can normally be reached on M-Th 5:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Black can be reached on 571-272-6956. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jacques H Louis-Jacques
Primary Examiner
Art Unit 3661

/jlj

Jacques H. Louis-Jacques
JACQUES H. LOUIS-JACQUES
PRIMARY EXAMINER